Research article

Transforming higher education institutions through EDI leadership: A bibliometric exploration

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ABSTRACT

This comprehensive bibliometric study analyzes 1820 journal articles from the Web of Science database to explore Equity, Diversity, and Inclusion (EDI) leadership in higher education institutions (HEIs). Utilizing co-citation and co-word analysis, the study identifies distinct thematic clusters. The co-citation analysis reveals five key themes: Race, Diversity, and Inclusion (RDI), Diversity, Leadership, and Self-Efficacy (DLSE), Gender Dynamics and Leadership Challenges, Women's Representation in Academic Medicine Leadership, and Transformational Leadership in HEIs. Meanwhile, the co-word analysis highlights three critical areas: Transformative Collaborative Resilience in HEIs, Advancing Gender Equality in Academic Medicine and STEM, and Inclusive Educational Leadership in HEIs. These themes collectively provide a deep understanding of the EDI leadership field's intellectual structure, suggesting significant areas for future research and practical application. The study emphasizes the necessity for HEIs to engage comprehensively in EDI leadership research, shedding light on the importance of transformative collaborative resilience, gender equality in STEM, and inclusive leadership. This research offers valuable insights for developing effective EDI leadership policies and practices, highlighting the interconnectedness of these themes in fostering a more equitable, diverse, and inclusive environment in higher education and beyond.

1. Introduction

Equity, diversity, and inclusion (EDI) are essential principles for establishing an environment that fosters impartiality, esteem, and a feeling of belonging for every individual [1–3]. EDI's inception can be attributed to the Civil Rights movement in the United States, which aimed to eradicate racial segregation and discrimination [4]. The concept of equity, which focuses on fairness and justice in the

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distribution of resources and opportunities, was a central principle of the movement. The concept of diversity arose as a result of the need to acknowledge and value differences in race, ethnicity, gender, sexual orientation, and other identities [5]. Inclusion, which emphasizes the need to create environments where individuals feel valued, respected, and supported, was later added to the concept of EDI [6]. Together, these principles form a framework for creating a more equitable, diverse, and inclusive society, where individuals are not only recognized for their differences but also given equal opportunities to thrive [7,8]. Although the origins of EDI are rooted in the United States, the principles have since been adopted by many organizations and institutions worldwide as a means of promoting social justice and equity [2,4].

There has been a growing recognition of the importance of EDI in the context of leadership in Higher Education Institutions (HEIs) in recent years. EDI leadership significantly impacts the education of college students and college management by fostering a culture that values all individuals for their unique qualities and abilities. Such leadership ensures that policies and practices are in place to provide equal opportunities for all students, irrespective of their backgrounds [9,10]. This contributes to a diverse intellectual community where students can learn from different perspectives, thus enhancing their educational experience, promoting critical thinking, and preparing them for a globalized world [11,12]. For college management, EDI leadership means recognizing and addressing institutional biases and barriers, thereby ensuring decisions taken at every level of the institution are fair and inclusive, leading to improved decision-making, increased innovation, and overall enhancement in organizational effectiveness [13,14].

However, HEIs have often been criticized for their failure to reflect the diversity of the broader society, resulting in a privileging of certain groups and a marginalization of others [1,15]. This gap between the promise of inclusivity and the reality of inequality represents a significant research gap that this study aims to address. Although previous research has emphasized the significance of EDI in organizational environments, there is a requirement for a specific examination of how EDI principles coincide with practices of leadership in the context of higher education institutions. This research seeks to address the existing knowledge gap by conducting a bibliometric analysis and reviewing relevant literature. It aims to provide valuable insights into the distinctive contributions of EDI leadership in enhancing the educational experiences of college students, managing higher education institutions, and fostering inclusive and equitable learning environments.

1.1. Literature review

Equity, Diversity, and Inclusion (EDI) form a triadic cornerstone in any institution conducive to fostering an environment underscored by justice, innovation, and collaborative synergy. Equity axiomatically maintains parity in opportunities by systematically countering barriers that marginalize distinct cohorts, thus enabling organizations to exploit the complete spectrum of individual potential [1,3]. The concept of diversity expands upon this potential by positing a value on a plethora of differentiating factors, inclusive but not limited to race, ethnicity, gender, socio-economic status, etc. [5,16]. This inherent heterogeneity of viewpoints contributes to dynamic solution ideation and improved decision-making. Inclusion is the integrating element that solidifies these disparate individuals into a unified consortium, and every individual feels esteemed, perceived, and engaged, engendering a sense of community and mutual respect within the organization [6,17]. Consequently, the unification of Equity, Diversity, and Inclusion forms a robust benchmark for any successful organization, propelling creativity, innovation, and efficacious functionality [4,7].

More policies and initiatives focusing on promoting EDI have been implemented in universities and colleges, such as increasing the representation of underrepresented groups in leadership positions [18], promoting a more diverse curriculum [12,19], and creating a more inclusive campus culture [7]. By promoting EDI, institutions are not only helping to create more diverse and inclusive communities but are also preparing their students to become more informed and engaged citizens in a rapidly changing world [1,3].

Overall, the literature suggests that EDI plays a critical role in the context of leadership in HEIs. By promoting leadership positions that incorporate EDI principles into the curriculum, creating a more inclusive campus culture, recognizing the importance of intersectionality, and actively engaging in promoting EDI, institutional leaders can help create a more equitable and inclusive society [12, 16,20]. Although there is a growing body of research on EDI roles in the context of leadership in HEIs, there are still some limitations to the existing research, including inadequate systemic and institutional-level interventions [21], limited evaluation of interventions [22], and limited attention to international perspectives [23]. Bibliometric analysis can help address these issues by identifying patterns and trends in the literature, uncovering research gaps, and highlighting areas that require further investigation, ultimately contributing to a more comprehensive understanding of EDI in higher education leadership.

1.2. Present study

This study seeks to develop a thorough understanding of the scholarly work related to EDI leadership in higher education institutions (HEIs). By conducting two distinct bibliometric analyses, the study addresses a gap in knowledge and offers valuable perspectives on past, present, and possible future directions for research in the field of EDI Leadership within the context of HEIs. Consequently, the goals for further research are determined by these particular bibliometric analyses.

1. To evaluate the significant and influential historical research while examining contemporary trends in EDI leadership at HEIs through co-citation analysis.
2. To determine new trends in EDI leadership at HEIs by employing co-word analysis.

2. Methods

2.1. Bibliometric approach

Understanding and evaluating the impact of research in various fields has become increasingly dependent on the bibliometric approach [24,25]. In the context of EDI leadership in HEIs, this methodology affords the chance to conduct a comprehensive analysis of the existing literature, identify significant past research, and investigate emerging trends. Through the utilization of co-word analysis, we can enhance our comprehension of the development of this field and its fundamental research themes by identifying influential past studies and analyzing current trends. Furthermore, the utilization of co-word analysis empowers researchers to predict forthcoming patterns and areas of research exploration, thus providing guidance for future research in the field of EDI leadership in higher education institutions.

2.2. Data collection

In this bibliometric study, we gathered data from the Web of Science (WoS) databases, particularly through the use of the topic search (TS) functionality. This method allowed us to focus our search on specific terms found in the titles, abstracts, and keywords of the articles. As outlined in Table 1, the selected search terms were applied to articles published from 1995 to 2023, with the search commencing on April 28th, 2023. This approach was meticulously designed to encompass the most relevant and comprehensive array of articles for our study. We chose the WoS database due to its widely recognized excellence in quality and thoroughness, which are pivotal for bibliometric research. This database is acclaimed globally as the most extensively used and reliable source for research publications and citations, offering an extensive scope of leading research across various fields [26–28].

2.3. Screening process

In this bibliometric analysis, our objective was to ensure that the selection of articles from the Web of Science (WoS) Database was not only relevant but also closely aligned with our research focus. The search covered articles up until April 28th, 2023, to include the most recent studies available. We focused our search within the WoS Database, specifically targeting articles that would provide insight into leadership and Equity, Diversity, and Inclusion (EDI) within the context of higher education. The keywords chosen for the search were comprehensive, including terms like "leadership*" AND "EDI role*" or "EDI" or "equity" or "diversity" or "inclusion" or "DEI" or "deir" or "belonging*" or "accessibilit*" AND "college*" OR "university education" OR "higher education*" OR "HEI*" OR "higher learning" OR "universit*" OR "tertiary education" OR "higher education institutions" OR "tertiary education providers" OR "college education" OR "higher education sector". We limited our search to focus on meso-level topics, as indicated in the "Citation Topics Meso" column, ensuring that our findings were directly relevant to the study's themes. Only journal articles were included in our analysis, intentionally excluding other types of documents such as conference proceedings, books, book chapters, editorials, white papers, and more, to maintain a focused and coherent dataset. Furthermore, the search was confined to articles published in English to ensure linguistic consistency and facilitate a streamlined analysis process. This meticulous screening process was essential for compiling a targeted set of articles that would allow for an in-depth bibliometric analysis using VOSviewer software, version 1.6.18. A detailed description of the screening process, including the search string and inclusion and exclusion criteria, is provided in Table 1.

2.4. Data analysis

This study's data analysis comprised four primary phases. The initial phase involved performing a descriptive statistical analysis with the Web of Science (WoS) database. The purpose of this first step was to collect fundamental descriptive information concerning the articles' publication details, specifically targeting three main aspects: (1) The total number of relevant articles, (2) The volume of citations and self-citations, and (3) The h-index score. After completing this descriptive statistical analysis, we proceeded to employ VOSviewer software for an in-depth exploration of the database, conducting both co-citation and co-word analyses.

Table 1
Search string, inclusion, and exclusion criteria.

Time Period	Up to April 2023
Search field	TOPIC
Search keywords	"leadership*" AND "EDI role*" or "EDI" or "equity" or "diversity" or "inclusion" or "DEI" or "deir" or "belonging*" or "deal" or "accessibilit*" AND "higher education*" OR "universit*" OR "college*" OR "tertiary education" OR "higher learning" OR "higher education institutions" OR "university education" OR "college education" OR "higher education sector" OR "tertiary education providers" OR "HEI*"
WoS Database	ALL
Citation Topics Meso	ALL
Document Type	Journal
Languages	English

2.5. Co-citation analysis

Co-citation analysis, a bibliometric method, quantifies how often two documents are cited together within a body of literature [28]. This approach allows researchers to pinpoint seminal and influential works, as well as to uncover the intellectual framework of a research domain [29,30]. Through applying co-citation analysis to studies on EDI leadership within higher education institutions (HEIs), it becomes possible to assess the impact of historical research and discern present trends in this area. Such analysis is instrumental in identifying key papers, authors, and topics of study, thereby establishing a foundation for subsequent research endeavors [31].

2.6. Co-word analysis

The focus of co-word analysis is on the co-occurrence of keywords in specific set of publications [32]. This technique is especially helpful for identifying emerging trends and research frontiers because it reveals patterns of association between concepts and subjects [33,34]. By analyzing the co-occurrence of keywords related to EDI leadership in HEIs, we can determine which areas of research are gaining prominence and which require further investigation.

3. Results

3.1. Publication trends and descriptive analysis

The Web of Science (WOS) database recorded 21,790 citations for the analyzed articles (N = 1820), excluding 21,183 citations as self-citations. The H-index reached 59, averaging 11.97 citations per article. These figures, derived from 1820 articles, reflect a growing scholarly interest in the study of EDI leadership within Higher Education Institutions (HEIs). The initial publication traced back to 1981, but a significant volume of contributions only became evident from 1992 onwards. The publication count has seen a steady increase, with a notable jump from 5 articles in 1992 to 261 articles in 2021. A minor drop to 238 publications was observed in 2022, suggesting a temporary decrease. Nonetheless, the research trajectory on EDI leadership in HEIs is expected to escalate in the coming years. Fig. 1 showcases the trend of articles published and their corresponding citations from 1981 to 2023.

3.2. Co-citation analysis

In the co-citation analysis, we set a citation threshold at 57, resulting in 14 references being identified for citation. Fig. 2 presents a network analysis constructed from these cited sources. Additionally, Table 2 displays the top ten co-cited references, ranked by their overall link strength [35]. received 37 citations, followed by Ref. [36] with 24 citations, and [37] with 18 citations.

The co-citation analysis reveals five distinct clusters, each defined by a unique thematic focus. These clusters represent groupings of publications that are connected by a common theme, with publications that have similar thematic content being grouped together within the same cluster, as indicated by nodes of the same color [38]. Fig. 2 shows the network structure resulting from the co-citation analysis, illustrating these five thematic clusters. The analysis of co-citation pertaining to EDI leadership in the context of HEIs is summarized in Table 3. Cluster 1, consisting of 17 publications, is labelled as "Race, Diversity, and Inclusion (RDI)". Cluster 2, with 16 publications, is labelled as "Diversity, Leadership, and Self-Efficacy (DLSE)". Cluster 3, comprising 9 publications, is labelled as
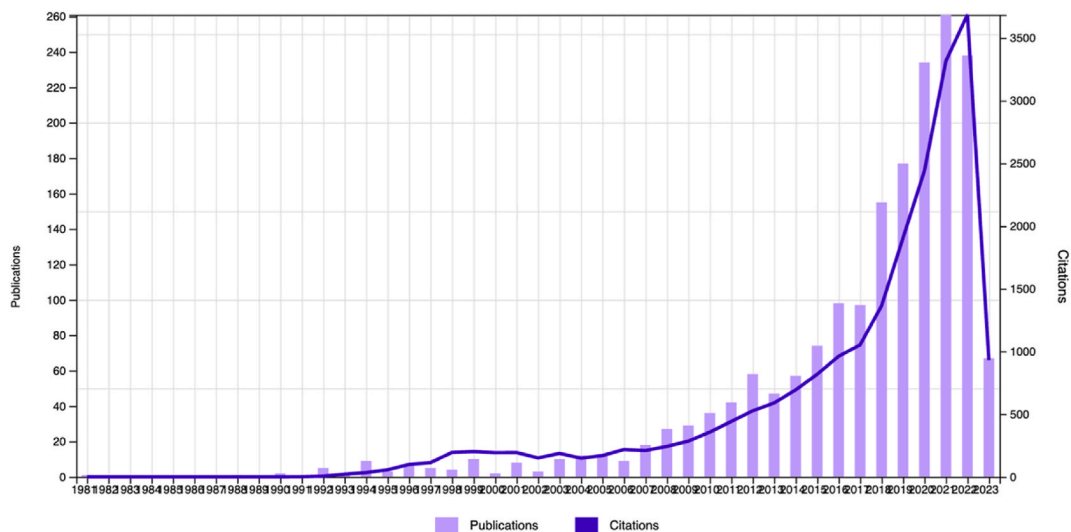

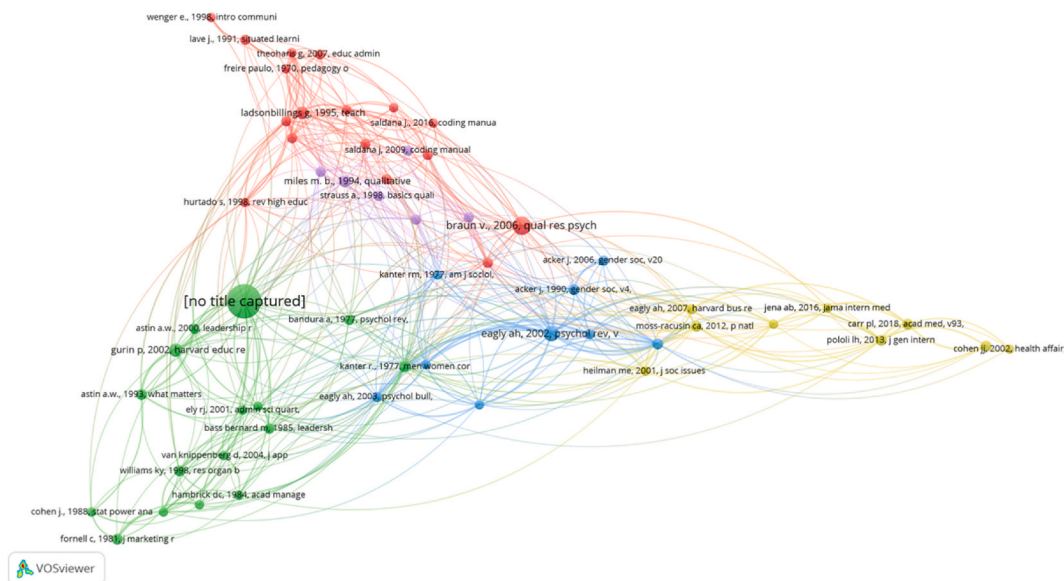**Fig. 1.** Total publications and citations from 1981 to 2023.

Fig. 2. Co-citation analysis visualized using VOSviewer.

Table 2
Top 10 documents by co-citation count and overall link strength.

No.	Documents	Citation	Total link strength
1	Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. Psychological Review, 109 (3), 573–598.	37	82
2	Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. *Teachers college record*, *97* (1), 47–68.	24	55
3	Ely, R. J., Ibarra, H., & Kolb, D. M. (2011). Taking gender into account: Theory and design for women's leadership development programs. *Academy of management learning & education, 10* (3), 474–493.	18	46
4	Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3* (2), 77-101	50	44
5	Eagly, A. H., Johannesen-Schmidt, M. C., & Van Engen, M. L. (2003). Transformational, transactional, and laissez-faire leadership styles: A meta-analysis comparing women and men. *Psychological bulletin, 129* (4), 569–591.	17	41
6	Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological bulletin, 137* (4), 616–642.	15	41
7	Heilman, M. E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of social issues, 57* (4), 657–674.	15	37
8	Kanter, R. M. (1977). *Men and women of the corporation.* Basic Books	18	37
9	Gurin, P., Dey, E., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard educational review, 72* (3), 330–367.	26	36
10	Delgado, R. & Stefancic, J. (2012) *Critical race theory: An introduction.* New York University Press, New York.	17	36

Source: Author interpretation based on VOSviewer analysis

"Gender Dynamics and Leadership Challenges". Cluster 4, also with 9 publications, is labelled as "Women's Representation in Academic Medicine Leadership", and Cluster 5, containing 6 publications, is labelled as "Transformational Leadership in HEIs".

3.3. Co-occurrence of keyword

For each of the 60 keywords identified, a minimum occurrence of 22 was recorded. The co-word analysis highlighted "leadership" as the predominant keyword, appearing 409 times, succeeded by "diversity" with 332 occurrences, and "women" featuring 169 times. Table 4 exhibits the 15 keywords that most frequently co-occur within this field of research.

The network structure of keyword co-occurrence is illustrated in Fig. 3, which represents three distinct clusters that appear to be interconnected. The analysis of co-word pertaining to EDI leadership in the context of HEIs is summarized in Table 5. Cluster 1, consisting of 24 keywords, is labelled as "Transformative collaborative resilience in HEIs". Cluster 2, consisting of 20 keywords, is labelled as "Advancing gender equality in academic medicine and STEM". Cluster 3, consisting of 16 keywords, is labelled as "Inclusive educational leadership in HEIs".

Table 3
Co-citation clusters focusing on EDI Leadership within HEIs.

Cluster	Cluster label	Number of publications	Representative publications
1 (Red)	Race, Diversity, and Inclusion (RDI)	17	Ahmed (2012); Hurtado et al. (1998); Bell (1980); Crenshaw (1990); DiMaggio & Powell (1983); Ray (2019); Theoharis (2007); Ladson-Billings (1998); Ladson-Billings & Tate (1995); Delgado & Stefancic (2012); Yosso (2005); Turner et al. (2008); Freire (2020); Lave & Wenger (1991); Wenger (1999).
2 (Green)	Diversity, Leadership, and Self-Efficacy (DLSE)	16	Ely & Thomas (2001); Gurin et al. (2002); Magolda & Astin (1993); Astin & Astin (2000); Bass (1985); Burns (1978); Hambrick & Mason (1984); Kanter (1977); Van Knippenberg et al. (2004); Williams & O'Reilly (1998).
3 (Blue)	Gender dynamics and leadership challenges	9	Acker (1990, 2006); Eagly & Carli (2007); Eagly & Karau (2002); Eagly et al. (2003); Ely et al. (2011); Kanter (1977); Koenig et al. (2011); Ryan & Haslam (2005).
4 (Yellow)	Women's representation in academic medicine leadership	9	Bickel et al., 2002; Carr et al., 2018; Eagly & Carli, 2007; Heilman, 2001; Jena et al., 2016; Moss-Racusin et al., 2012; Pololi et al., 2013; Peter et al., 2013.
5 (Purple)	Transformational Leadership in HEIs	6	Bryman (2007); Lincoln & Guba (1986); Morley (2013)

Source: Interpretation of results based on VOSviewer analysis by the authors

4. Discussion

4.1. Influential historical research and contemporary trends in EDI leadership within HEIs

The first trend focuses on Race, Diversity, and Inclusion (RDI) in educational institutions. This cluster assembles research on RDI, emphasizing critical race theory, intersectionality, and organizational structures [39,40]. discuss the importance of creating inclusive environments for marginalized populations when examining racism and diversity within institutions [41,42]. jointly examine the legal landscape surrounding desegregation and intersectionality, revealing limitations in legal frameworks for addressing systemic discrimination. The concept of institutional isomorphism, introduced by Ref. [43], explains how organizations adopt similar structures and practices due to external pressures [44]. presents a theory of racialized organizations, demonstrating how racial hierarchies are embedded within organizational structures [45]. advocates for social justice leadership in educational administration. Critical Race Theory (CRT) is crucial for understanding race and education [36,46,47]. describe CRT's foundations, highlighting the role of race in perpetuating educational inequality [48]. expands on this by examining community cultural wealth and recognizing marginalized communities' contributions to education. Diversity in faculty is also essential for combating institutional racism. Lastly [49–51], emphasize the significance of transformative, situated learning and communities of practice in fostering inclusive educational spaces and challenging conventional power dynamics.

The trend also includes complex relationships between Diversity, Leadership, and Self-Efficacy (DLSE) in higher education institutions. Studies like [52] examine the effect of cultural diversity on workgroup processes and outcomes, highlighting both benefits and challenges of diverse perspectives [53]. argues that exposure to diverse cultures and ideas in higher education enhances educational outcomes, such as critical thinking skills and cognitive development [54]. investigates influential aspects of the college experience on students, while [55] advocates for higher education institutions to contribute to social change through leadership. The significance of effective leadership in propelling high performance is underscored in Refs. [56,57]. [58] examines the relationship between diversity and performance in the field of organizational studies, proposing that organizations mirror the qualities of their most senior executives. The importance of gender diversity within organizations is underscored in Ref. [59]. A comprehensive framework connecting workgroup diversity and performance is presented in Ref. [60], while a review of four decades' worth of research on demographics and diversity in organizations in Ref. [61] emphasizes the need for continued investigation in this area.

Next, the trend also focuses on "Gender Dynamics and Leadership Challenges". This cluster examines the complex dynamics of gendered organizations, inequality regimes, and the unique challenges female leaders face, drawing from authoritative works on gender and leadership [62,63]. argue that inequality regimes perpetuate disparities in gender, class, and race within organizations by emphasizing the significance of hierarchies, jobs, and bodies in shaping gendered organizations. The Role Congruity Theory by Ref. [35] highlights the bias against female leaders due to the mismatch between perceived leadership roles and traditional gender roles. According to Ref. [64], women's leadership styles are more transformational and relational, while men's are more transactional and laissez-faire. Despite these differences, men and women are equally effective as leaders [65]. found that leader stereotypes are often masculine, creating additional barriers for women [59]. explored the effects of skewed sex ratios on group dynamics, focusing on tokenism women face in male-dominated environments [37]. emphasized the importance of incorporating gender into women's leadership development programs to promote equity and efficacy. The "glass cliff" concept, as proposed by Ref. [66], elucidates the tendency to assign women to precarious leadership positions, thereby contributing to the ongoing issue of underrepresentation in leadership roles.

The trend of "Women's Representation in Academic Medicine Leadership" investigates the obstacles women face in attaining leadership positions in academic medicine and identifies possible solutions to increase their representation. The underrepresentation of women in academic medicine leadership is influenced by factors like gender stereotypes, implicit biases, and cultural barriers [67–69]. Despite efforts to promote diversity [70,71], show that women remain underrepresented in leadership positions [72]. argues that the lack of retention, promotion, and representation of women is a major concern, with gender disparities persisting even when controlling for age, experience, and research productivity [73]. found a significant gender pay gap in public medical schools in the

Table 4
The 15 most frequently occurring keywords identified in the keyword co-occurrence analysis.

Rank	Keyword	Occurrences	Total link strength
1	Leadership	409	1051
2	Diversity	332	945
3	Women	169	584
4	Gender	151	549
5	Higher education	164	432
6	Faculty	96	369
7	Equity	101	312
8	Higher-education	100	306
9	Students	104	303
10	Race	76	291
11	Impact	97	279
12	Education	119	258
13	Performance	94	255
14	Management	90	254
15	Experiences	70	243

Fig. 3. Co-word analysis visualized using VOSviewer.

United States, exacerbating disparities. These disparities may result from implicit biases among science faculty, who tend to favor male students over equally qualified female students [69]. [68] suggests that gender stereotypes and expectations contribute to the underrepresentation of women in leadership positions, while [74] find that minorities also struggle to advance in academic medicine. To address these issues [70], suggest developing and implementing strategies to increase women's leadership in academic medicine, including mentoring, career development programs, and institutional commitment to diversity.

Lastly, the trend delves into "Transformational Leadership in HEIs". This trend focuses on transformational leadership in higher education, emphasizing effectiveness, rigor, authenticity, and inclusiveness [75]. provides a literature review of various leadership theories and models, stressing the need for adaptable leaders in the higher education sector [76]. raise important questions regarding the evaluation of leadership in higher education, arguing that credibility and authenticity are essential components of the evaluation process. They emphasize the need for rigorous evaluations that reflect the complexities and subtleties of leadership in this context. Finally [77], examines the impact of traditional leadership models on women in higher education from a feminist standpoint. The author argues that the emphasis on leadership as a key factor in success and advancement in the sector has negatively impacted women and gender equality. She emphasizes the need for more inclusive and gender-sensitive leadership models.

Table 5
Analysis of keyword co-occurrence related to EDI Leadership in HEIs.

Cluster No and colour	Cluster label	Number of keywords	Representative Keywords
1 (Red)	Transformative collaborative resilience in HEIs	24	"Attitudes", "challenges", "climate", "collaboration", "COVID-19", "framework", "higher-education", "impact", "implementation", "innovation", "knowledge", "leadership", "management", "model", "organizations", "outcomes", "performance", "program", "quality", "satisfaction", "transformational leadership", "universities, "work".
2 (Green)	Advancing gender equality in academic medicine and STEM	20	"Academic medicine", "care", "culture", "discrimination", "equality", "experiences", "faculty", "gender", "gender equality", "health", "medicine", "perceptions", "physicians", "promotion, "representation", "retention", "science", "stem", "success", "women".
3 (Blue)	Inclusive educational leadership in HEIs	16	"College", "color", "critical race theory", "curriculum", "diversity", "education", "education", "educational leadership", "equity", "higher education", "identity", "inclusion", "leadership development", "race", "social justice", "students", "training".

Source: Interpretation of results based on VOSviewer analysis by the authors

4.2. Emerging trends in EDI leadership within HEIs

The co-word analysis revealed the first emerging trend related to "Transformative Collaborative Resilience in HEIs." Higher education institutions have faced numerous challenges in recent years, including the effects of the COVID-19 pandemic [78]. To ensure long-term success and sustainability, these challenges have necessitated rapid adaptation and innovation by universities and organizations [79]. This necessitates a new model of transformative collaborative resilience. This trend focuses on integrating knowledge, leadership, and innovation to promote positive outcomes and stakeholder satisfaction. Transformational leadership is crucial in guiding institutions toward effective adaptation and growth, supported by a robust organizational management framework. This leadership style encourages collaborative knowledge and expertise sharing [6], essential for implementing innovative solutions in a rapidly changing world. A comprehensive and adaptable framework is necessary to navigate the complexities of higher education [80]. This framework should guide strategic planning and decision-making, allowing for customization to individual organizational needs. Universities can measure and evaluate their progress effectively, prioritizing education quality and aligning goals with performance indicators. Continuous improvement and knowledge management are crucial for the sustainability and efficacy of this approach [81]. Regular assessment of outcomes and program impact allows universities to refine their approaches and foster innovation, ensuring ongoing stakeholder satisfaction.

The second emerging trend relates to "Advancing Gender Equality in Academic Medicine and STEM." Historically, academic medicine and STEM fields have been male-dominated, posing challenges for women's success and advancement [82]. This trend explores gender, culture, and experiences in these fields, focusing on promoting gender equality, representation, and retention of women. The goal is to provide women with equal success opportunities, advancement, and personal development while addressing discrimination and biases [83,84]. Strategies to overcome cultural and systemic barriers are essential [85]. Initiatives like mentorship, networking, and professional development programs can aid women's retention and career advancement, contributing to a diverse and robust scientific community [86].

Lastly, the trend also focuses on "Inclusive Educational Leadership in HEIs". The growing importance of inclusive educational leadership in the ever-changing landscape of higher education is undeniable. Inclusion ensures equal access to quality education and growth opportunities for all students, regardless of race, color, or socioeconomic background [87,88]. Critical Race Theory (CRT) is vital for understanding race and racism in education. Educational leaders can use CRT to develop strategies to address systemic inequities and promote inclusive, equitable learning environments [89]. This leadership approach emphasizes empathy, cultural competence, and the ability to recognize and challenge implicit biases [90]. Curricula should reflect the diversity of student identities and experiences [91], including marginalized communities' perspectives in course content and teaching methods [92]. Training programs for educational leaders should emphasize embracing diversity and promoting equity [93]. These programs should equip leaders to foster inclusive environments where diverse students can thrive. By championing diversity, inclusion, and social justice, educational leaders can empower students to embrace their identities and contribute to a more inclusive learning community. Consequently, higher education institutions can become agents of change, actively working toward a more inclusive and equitable society.

4.3. Implications

This study emphasizes the need for higher education institutions to adopt a comprehensive approach to EDI leadership research. The findings suggest that more scholarly effort is required to comprehensively understand the research landscape in this field. By employing co-citation and co-word analyses, five distinct clusters were identified for co-citation analysis and three clusters were identified for co-word analysis. This provides a more comprehensive understanding of the intellectual structure of the EDI leadership field. This information can assist researchers in better orienting their work within the field and identifying knowledge gaps [94]. Subsequent investigations may explore transformative collaborative resilience within HEIs, the promotion of gender equality in academic medicine and STEM, and inclusive educational leadership in HEIs [95–97]. These are illustrative instances of the three

overarching theme clusters that surfaced from a more exhaustive review of specialized literature. These three concepts are interrelated and have substantial theoretical implications.

The practical implication of this research is that it can assist higher education institutions in developing more effective EDI leadership policies and practices. The study can inform institutional strategies to develop and promote greater diversity, equity, and inclusion by providing insights into the current state and future prospects of EDI leadership in the context of HEIs [98]. For example, the significance of transformative collaborative resilience in HEIs, with an emphasis on the need for leadership, innovation, and knowledge integration to foster positive outcomes and stakeholder satisfaction [99]. It explores how higher education institutions can adapt and expand in response to unprecedented challenges, such as the COVID-19 pandemic. Advancing gender equality in academic medicine and STEM, with a focus on promoting gender equality, representation, and retention of women [100]; exposing the cultural and systemic barriers that women face in these fields [101]; and providing mentorship, networking, and professional development opportunities to address these disparities. Inclusive educational leadership in HEIs emphasizes the need for leaders to cultivate empathy, cultural competence, and the ability to recognize and combat implicit biases [102]. Therefore, it is important to consider the diversity of student identities and experiences when designing the curriculum and to provide educational leaders with training programs that equip them with the knowledge and skills necessary to foster inclusive learning environments [103]. In addition, institutions can use the findings to identify research gaps and develop targeted initiatives to address specific EDI leadership issues. Furthermore, by demonstrating the knowledge structure and identifying the most influential publications, practitioners can be assisted in locating and gaining access to the most valuable and pertinent resources in the field.

The study's theoretical and practical implications highlight the importance of EDI leadership in higher education institutions, providing valuable insights into the present state and future prospects of this field. Specifically, the study sheds light on the significance of leadership, self-efficacy, and gender dynamics in HEIs. Using these insights, HEIs can cultivate environments that prioritize diversity and equity and are more inclusive. In addition, the study can contribute to the formulation of policies designed to address the underrepresentation of women in academic medicine leadership [104]. Overall, the study highlights the need to expand our knowledge of EDI leadership research in order to develop more effective strategies for promoting diversity, equity, and inclusion, not only in higher education but also beyond.

5. Conclusion, limitations and future avenues

This review provides significant perspectives on the emerging domain of EDI leadership within institutions of higher education. It is novel in that it employs co-citation and co-word analysis to examine the EDI leadership literature in a distinctive fashion. The authors were able to discern the development of this domain and its fundamental research concerns, concerning EDI leadership in HEIs, by employing these methodologies. The aforementioned results highlight the primary domains of interest in EDI leadership studies and establish a structure for subsequent research pursuits. Additionally, the review's identification of 1820 relevant publications on EDI leadership highlights the growing interest in this topic and its anticipated continued relevance in the years to come. While bibliometric systematic literature reviews are prevalent in fields such as business management [105], they are relatively new to the field of psychology [106]. This review's application of this methodology to the field of psychology demonstrates its potential for providing valuable insights into the development of EDI leadership practices in higher education settings.

Nevertheless, this review is confined to sources indexed by the WoS, potentially excluding relevant publications. The gray literature was not considered, Scopus-indexed and other sources were not included, and non-English documents were excluded. The implementation of this methodology for literature selection might have led to the exclusion of relevant data, which could have had an adverse impact on the thoroughness of the review. Consequently, caution should be exercised when interpreting the results of this review. Further research, including a more exhaustive review of the literature, is warranted to draw more definitive conclusions. The finding of this review could be complemented with the study of systematic review and meta-analysis to deepen and present the temporal and topological structure of EDI leadership.

In addition, to enhance the comprehensiveness of the EDI leadership literature, forthcoming investigations would be strengthened by the utilization of numerous databases and search methodologies. Recognizing the search string and inclusion/exclusion criteria, which were intentionally implemented to streamline the outcomes, is of utmost significance. The authors' inductive reasoning and data interpretation may be subjective, which could lead to divergent interpretations of the study's key findings. To overcome such subjectivity and the potential risk of bias, the interpretation of the clusters' themes was agreed upon by authors through an inter-rater reliability cross-check to ensure the labelling is correct according to the network map.

Notwithstanding its constraints, this bibliometric investigation offers a significant augment to the comprehension of EDI leadership within the field of higher education. Its findings have the potential to inform future research and policy development aimed at promoting diversity, equity, and inclusion in HEIs and beyond.

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Xiangge Zhao: Writing – original draft, Visualization, Validation, Resources, Funding acquisition, Data curation, Conceptualization. **Walton Wider:** Writing – original draft, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Leilei Jiang:** Writing – review & editing, Resources. **Muhammad Ashraf Fauzi:** Writing – review & editing. **Jem Cloyd M. Tanucan:** Writing – review & editing. **Jiaming Lin:** Writing – review & editing. **Lester Naces Udang:** Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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